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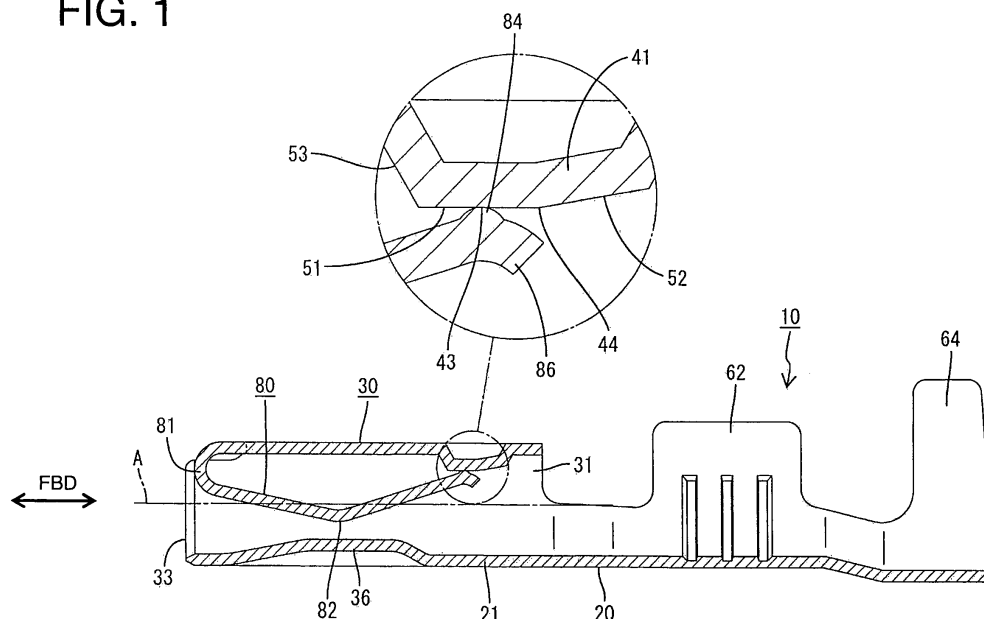
(54) **A female terminal fitting**

(57) An object of the present invention is to prevent the insertion stroke of a male tab from being extended and to facilitate gap management.

A female terminal fitting 10 is provided with a tubular main portion 30, into which a mating male tab 70 is inserted along an axial center A from front, and a resilient contact piece 80 extending backward in the main portion 30 and having a free end slidable on an inner surface of the main portion 30. The inner surface of the main portion

30 includes a first slide surface 51 for displacing the free end of the resilient contact piece 80 with a distance thereof to the axial center A of the main portion 30 kept contact while the free end of the resilient contact piece 80 slides from a slide start position 43 to a slide intermediate position 44 and a second slide surface 52 for displacing the free end of the resilient contact piece 80 in such a direction as to extend the distance to the axial center A of the main portion 30 while this free end slides from the slide intermediate position 44 to a slide end position 45.

FIG. 1



Description

[0001] The present invention relates to a female terminal fitting.

[0002] A female terminal fitting disclosed in Japanese Unexamined Patent Publication No. H10-321279 is provided with a tubular main portion, into which a mating male tab is inserted along its axial center from front, and a resilient contact piece resiliently deformably formed in the main portion to extend backward, wherein a free end of the resilient contact piece slides on an inner surface of the main portion while an intermediate portion (contact portion) thereof is held in contact with the male tab in the insertion process of the male tab into the main portion. An inclined surface for displacing the free end of the resilient contact piece in such a direction as to extend a distance between this free end and the axial center of the main portion is formed on the inner surface of the main portion from a slide start position to a slide end position of the free end of the resilient contact piece.

[0003] According to the above construction, a sudden increase of the insertion resistance of the male tab can be avoided since the free end of the resilient contact piece slides on the inclined surface of the main portion upon the connection with the mating male tab. However, in the above case, a necessary contact pressure with the male tab is ensured by the sliding-down movement of the free end of the resilient contact piece on the inclined surface, wherefore the insertion stroke of the male tab is extended.

[0004] On the other hand, the extension of the insertion stroke of the male tab can be avoided by adopting such a construction in which the horizontal inner surface of the main portion receives the free end of the resilient contact piece. However, in this case, the contact pressure suddenly increases due to frictional resistance between the free end of the resilient contact piece and the horizontal surface. Thus, as shown by a line Y in FIG. 4, a displacement width G of the contact portion of the resilient contact piece in a permissible range of the necessary contact pressure (between contact pressure upper and lower limits) becomes smaller, thereby making gap management difficult.

[0005] The present invention was developed in view of the above situation and an object thereof is to prevent the insertion stroke of a male tab from being extended and to facilitate gap management.

[0006] This object is solved according to the invention by the features of the independent claim. Preferred embodiments of the invention are subject of the dependent claims.

[0007] According to the invention, there is provided a female terminal fitting, comprising:

a substantially tubular main portion, into which a mating male tab is or can be at least partly inserted along an axial center substantially from front, and a resilient contact piece formed to extend substan-

tially backward in or at the main portion and resiliently deformable by the male tab being at least partly inserted into the main portion such that the free end thereof slides on an inner surface of the main portion, wherein the inner surface of the main portion includes:

a first slide surface for displacing the free end of the resilient contact piece in such a direction as to keep a distance between the free end and the axial center of the main portion substantially constant or to shorten the distance while the free end slides from a slide start position to a slide intermediate position, and

a second slide surface for displacing the free end of the resilient contact piece in such a direction as to extend the distance between the free end and the axial center of the main portion while the free end slides from the slide intermediate position to a slide end position.

[0008] Since a necessary contact pressure with the male tab can be reached early by a sliding movement of the free end of the resilient contact piece on the first slide surface of the main portion, the extension of the insertion stroke of the male tab can be prevented. Further, since a large displacement width can be set for the contact portion of the resilient contact piece in a permissible range of the necessary contact pressure by a sliding movement of the free end of the resilient contact piece on the second slide surface of the main portion, gap management can be facilitated.

[0009] According to a preferred embodiment of the invention, the first and second slide surfaces are formed by partly embossing a peripheral wall of the main portion to project inwardly.

[0010] Since the first and second slide surfaces are formed by partly embossing the peripheral wall of the main portion to project inwardly, the necessary contact pressure with the male tab can be adjusted to a desired value according to an embossing depth.

[0011] Preferably, the first slide surface is horizontally continuous at the same height position in forward and backward directions and the second slide surface is obliquely continuous at the same angle of inclination with respect to forward and backward directions.

[0012] Since the first slide surface is continuous at the same height in forward and backward directions and the second slide surface is obliquely continuous at the same angle of inclination with respect to forward and backward directions, an increasing tendency of the contact pressure in the connection process with the male tab can be relatively easily predicted.

[0013] Further preferably, the first slide surface and the second slide surface relatively are arranged to define an obtuse angle therebetween.

[0014] Still further preferably, the free end of the resilient contact piece is in contact with the inner surface of

a plate portion of the main portion when the resilient contact piece is in a natural state where it is not in contact with the male tab.

[0015] Further preferably, the free end of the resilient contact piece has an at least partly spherical projection projecting toward the main portion, wherein the at least partly spherical projection can be held in sliding point contact with the inner surface of the main portion.

[0016] Still further preferably, a part of the free end of the resilient contact piece behind its contact portion with the main portion, preferably behind the spherical projection, serves as a bent portion bent at an obtuse angle toward the axial center, so that the free end of the resilient contact piece faces obliquely inwardly toward the back.

[0017] Further preferably, the male tab can be resiliently sandwiched between a contact portion of the resilient contact piece and a receiving portion provided at a substantially opposite portion of the main portion.

[0018] Most preferably, the first and second slide surfaces are arranged on the inner surface of an elevated portion formed by partly embossing a facing plate portion of the main portion to project inwardly, so that the necessary contact pressure with the male tab can be adjusted to a desired value according to an embossing depth.

[0019] These and other objects, features and advantages of the present invention will become more apparent upon reading of the following detailed description of preferred embodiments and accompanying drawings. It should be understood that even though embodiments are separately described, single features thereof may be combined to additional embodiments.

FIG. 1 is a side view in section of a female terminal fitting according to one embodiment,

FIG. 2 is a side view in section of the female terminal fitting when a male tab is properly inserted into a main portion,

FIG. 3 is a plan view of the female terminal fitting, and

FIG. 4 is a line graph showing a change of a contact pressure load.

[0020] One preferred embodiment of the present invention is described with reference to FIGS. 1 to 4.

[0021] A female terminal fitting 10 of this embodiment is integrally or unitarily formed, for example, by bending, folding and/or embossing an electrically conductive (preferably metal) plate and provided with a base plate portion 20 (preferably substantially narrow and long in forward and backward directions FBD), a main portion 30 located on or near a front part 21 of the base plate portion 20, a wire connection portion (preferably comprising a barrel portion 60) located on or near a rear part of the base plate portion 20, and a resilient contact piece 80 located in or at or on the main portion 30 and extending substantially backward.

[0022] The barrel portion 60 includes at least one wire barrel 62 comprised of a one or more, preferably pair of lateral (left and/or right) front crimping pieces 61 to be

crimped or bent or folded into connection with the insulation coating at an end of an unillustrated wire and/or an insulation barrel 64 comprised of one or more, preferably a pair of lateral (left and/or right) rear crimping pieces 63 to be crimped or bent or folded into connection with the insulation coating at the end of the wire or a resilient or rubber plug mounted on this insulation coating, the wire barrel 62 being located before the insulation barrel 64.

[0023] On the other hand, the main portion 30 preferably has a substantially tubular shape open both forward and backward, more specifically a substantially rectangular or polygonal tubular shape, and preferably includes the front part of the base plate portion 20, a pair of side plate portions 31 standing up or projecting substantially at an angle different from 0° or 180°, preferably substantially at right angles from the opposite widthwise ends (or near thereto) of the front part 21 of the base plate portion 20, and a facing plate portion 32 substantially continuous and substantially at an angle different from 0° or 180°, preferably substantially at right angles to the stand-up ends of the opposite side plate portions 31 and preferably substantially facing the front part 21 of the base plate portion 20. A mating male tab 70 is at least partly insertable into the main portion 30 substantially along an axial center A from front, and the front opening of the main portion 30 serves as an insertion opening 33 for the male tab 70.

[0024] As shown in FIG. 1, the resilient contact piece 80 is resiliently deformably formed by folding or bending a plate piece extending forward from (or provided at) the front end of the facing plate portion 32 in developed shape such that a mountain-shaped piece extends backward or inward, and can resiliently come into contact with the male tab 70. A front end portion of the resilient contact piece 80 preferably is formed substantially into a semi-circular curved portion 81, and the front end position thereof is located slightly behind the front ends of the base plate portion 20 and the opposite side plate portions 31 in forward and backward directions FBD because of the presence of at least one slit 35 formed in front end portions of the corresponding side plate portion 31 and the facing plate portion 32.

[0025] The tip or apex (bent part) of the mountain-shaped resilient contact piece 80 serves as a contact portion 82 with the male tab 70, and the male tab 70 is or can be resiliently sandwiched between the contact portion 82 and a receiving portion 36 provided at the base plate portion 20 and preferably projecting inwardly. The receiving portion 36 preferably is formed by (preferably partly) embossing the base plate portion 20 to project inward, preferably is substantially in the form of a trapezoidal rib narrow and long in forward and backward directions FBD and receives the male tab 70 with a substantially flat straight surface substantially parallel to an inserting direction ID (forward and backward directions FBD). A distance between the contact portion 82 and the receiving portion 36 preferably is set slightly smaller than the thickness of the male tab 70 when the resilient contact

piece 80 is in a natural state where it is not in contact with the male tab 70.

[0026] The rear or distal end (hereinafter, "free end") of the resilient contact piece 80 preferably is in contact with the inner surface of the facing plate portion 32 in the above natural state. The free end of the resilient contact piece 80 preferably has an at least partly spherical projection 84 projecting toward the facing plate portion 32, and this spherical projection 84 can be held in sliding point contact with the inner surface of the facing plate portion 32. A part of the free end of the resilient contact piece 80 behind the spherical projection 84 preferably serves as a bent portion 86 bent at an obtuse angle toward the inner side (toward the axial center A), so that the free end of the resilient contact piece 80 faces obliquely inwardly toward the back.

[0027] The inner surface of the facing plate portion 32 of the main portion 30 has one or more slide surfaces 51, 52, 53 and 54, on which the free end of the resilient contact piece 80 (spherical projection 84) slides or can slide when the resilient contact piece 80 is resiliently deformed by the male tab 70 being inserted into the main portion 30. These slide surfaces 51, 52, 53 and 54 are the inner surfaces of an elevated portion 41 (see FIG. 3) formed by embossing an intermediate part (preferably a substantially rectangular widthwise middle part) of the facing plate portion 32 in plan view to project inwardly, and are located closer to the axial center A than the other part of the inner surface of the facing plate portion 32. More specifically, the slide surfaces 51, 52, 53 and 54 include a first slide surface 51 having an area extending from a slide start position 43 where the slide of the free end (spherical projection 84) of the resilient contact piece 80 starts to a slide intermediate position 44, a second slide surface 52 having an area substantially continuous with the rear end of the first slide surface 51 and extending from the slide intermediate position 44 to a slide end position 45 where the slide of the free end (spherical projection 84) of the resilient contact piece 80 ends, a first elevating surface 53 connecting the other part of the inner surface of the facing plate portion 32 and the starting end of the first slide surface 51 and/or a second elevating surface 54 connecting the other part of the inner surface of the facing plate portion 32 and the termination end of the second slide surface 52.

[0028] The first and second elevating surfaces 53, 54 preferably are substantially straight surfaces inclined at the substantially same angle to approach each other as they extend inwardly, the first elevating surface 53 is longer than the second elevating surface 54, and/or the termination end of the first elevating surface 53 is located closer to the axial center A than the starting end of the second elevating surface 54. These first and second elevating surfaces 53, 54 are not in contact with the resilient contact piece 80 and/or do not directly involve the sliding movement of the free end (spherical projection 84) of the resilient contact piece 80.

[0029] The first slide surface 51 preferably substantial-

ly is a horizontal straight surface (substantially parallel to the inserting direction ID and/or the forward and backward directions FBD) at a substantially constant distance to the axial center A from its starting end (termination end of the first elevating surface 53) to its termination end (starting end of the second slide surface 52), and/or the second slide surface 52 preferably substantially is a straight surface moderately inclined outwardly (with respect to the inserting direction ID and/or the forward and backward directions FBD) to be gradually more distanced from the axial center A from its starting end (termination end of the first slide surface 51) to its termination end (starting end of the second elevating surface 54). The above slide start position 43 is set at an intermediate position of the first slide surface 51, more specifically in the center of the first slide surface 51 in forward and backward directions FBD, and the slide intermediate position 44 is set at the termination end of the first slide surface 51 (starting end of the second slide surface 52), and the slide end position 45 is set at an intermediate position of the second slide surface 52, more specifically at a position of the second slide surface 52 slightly closer to the first slide surface 51 than the center in forward and backward directions FBD.

[0030] Next, functions of this embodiment are described.

[0031] As shown in FIG. 1, the free end (preferably the spherical projection 84) of the resilient contact piece 80 is supported in contact with the first slide surface 51 of the main portion 30 at the slide start position 43 before the connection with the mating male tab 70 is started, whereby the resilient contact piece 80 is substantially supported at both ends. When the connection with the male tab 70 is started by connecting unillustrated male and female connectors, the mating male tab 70 is at least partly inserted into the main portion 30 of the female terminal fitting 10 through the insertion opening 33 from front.

[0032] When the leading end of the male tab 70 comes into contact with the contact portion 82 of the resilient contact piece 80, the resilient contact piece 80 is (preferably substantially entirely) resiliently deformed by this pressing force and the free end (spherical projection 84) of the resilient contact piece 80 starts moving backward along the first slide surface 51 from the slide start position 43. The free end (preferably the spherical projection 84) of the resilient contact piece 80 is horizontally displaced with its distance to the axial center A kept substantially constant while sliding from the slide start position 43 to the slide intermediate position 44, i.e. while sliding on the first slide surface 51.

[0033] When the resilient contact piece 80 is at least partly inserted into the main portion 30, the free end (preferably the spherical projection 84) of the resilient contact piece 80 transfers from the first slide surface 51 to the second slide surface 52. The free end (spherical projection 84) of the resilient contact piece 80 preferably is displaced in such a direction as to be more distanced from

the axial center A toward the slide end position 45 while sliding from the slide intermediate position 44 to the slide end position 45, i.e. while sliding on the second slide surface 52, and then preferably slides down toward the termination end of the second slide surface 52. When the insertion of the resilient contact piece 80 into the main portion 30 is completed in this way, the free end (preferably the spherical projection 84) of the resilient contact piece 80 is supported in contact with the inclined second slide surface 52 at an intermediate position (preferably the slide end position 45) as shown in FIG. 2, whereby a suitable contact pressure (necessary contact pressure) is given between the contact portion 82 of the resilient contact piece 80 and the male tab 70.

[0034] While the free end (preferably the spherical projection 84) of the resilient contact piece 80 slides on the first and second slide surfaces 51, 52, a contact pressure load with the male tab 70 gradually increases. Here, FIG. 4 is a graph in which a vertical axis represents the contact pressure load with the male tab 70 and a horizontal axis represents an amount of displacement of the contact portion 82 (a moved amount of the contact portion 82 in vertical direction (direction at an angle different from 0° or 180°, preferably substantially orthogonal to the inserting direction ID of the male tab 70)). In FIG. 4, a line X shows an example of this embodiment and the line Y shows a comparative example in which the free end (spherical projection 84) of the resilient contact piece 80 slides on the first slide surface 51 (horizontal surface) during the entire connecting operation. A bending point of the line X corresponds to the slide intermediate position 44, i.e. a transition point (44) at which the free end (preferably the spherical projection 84) of the resilient contact piece 80 transfers from the first slide surface 51 to the second slide surface 52.

[0035] According to this, the contact pressure load relatively suddenly increases in proportion to an increase in the amount of displacement of the contact portion 82 while the free end (preferably the spherical projection 84) of the resilient contact piece 80 is sliding on the first slide surface 51, and reaches the vicinity of the necessary contact pressure when the free end (preferably the spherical projection 84) of the resilient contact piece 80 reaches the slide intermediate position 44.

[0036] Thereafter, the contact pressure load increases preferably in proportion to the increase in the amount of displacement of the contact portion 82 while the free end (preferably the spherical projection 84) of the resilient contact piece 80 is sliding on the second slide surface 52, but its increasing rate (or derivative) becomes or is smaller. Thus, the amount of displacement of the contact portion 82 until the contact pressure load reaches the necessary contact pressure from the slide intermediate position 44 is smaller in the comparative example, wherefore the necessary contact pressure is reached earlier in the comparative example than in this embodiment. However, a difference is small since the contact pressure load already reaches the vicinity of the necessary contact

pressure at the slide intermediate position 44 in this embodiment. A permissible range (between contact pressure upper and lower limits) in the management of the necessary contact pressure is set, and the contact pressure load preferably gradually increases in proportion to the amount of displacement of the contact portion 82 in this permissible range.

[0037] According to this embodiment, as is clear from FIG. 4, the necessary contact pressure with the male tab 70 can be reached early by the sliding movement of the free end (preferably the spherical projection 84) of the resilient contact piece 80 on the first slide surface 51 of the main portion 30. Therefore, it can be prevented that the insertion stroke of the male tab 70 is extended more than necessary, thereby improving operability.

[0038] A displacement width W of the contact portion 82 in the permissible range of the necessary contact pressure preferably is about twice as large as the displacement width G of the contact portion 82 in the comparative example because the free end (preferably the spherical projection 84) of the resilient contact piece 80 slides along the inclined surface of the slide surface 53. Therefore, a large value can be set for gap management at the time of manufacturing to facilitate the gap management.

[0039] If the resilient contact piece 80 should be permanently set in fatigue due to the repeated use or the like (when the spring property of the resilient contact piece 80 decreases), the contact pressure load decreases according to the displacement width when the position of the contact portion 82 of the resilient contact piece 80 is displaced. However, according to this embodiment, a drop in the contact pressure load with respect to the displacement width can be suppressed as compared to the comparative example, wherefore performance can be improved.

[0040] Since the first and second slide surfaces 51, 52 preferably are arranged on the inner surface of the elevated portion 41 (preferably formed by partly embossing the facing plate portion 32 of the main portion 30 to project inwardly), the necessary contact pressure with the male tab 70 can be adjusted to a desired value according to an elevation distance (preferably an embossing depth).

[0041] Further, since the first slide surface 51 preferably substantially is continuous at the same height position in forward and backward directions FBD and/or the second slide surface 52 is obliquely continuous at the same angle of inclination with respect to forward and backward directions FBD, the increasing tendency of the contact pressure in the connection process with the male tab 70 can be easily predicted from a proportional relationship. Furthermore, since the free end (preferably the spherical projection 84) of the resilient contact piece 80 preferably is in contact with the first slide surface 51 of the main portion 30 at the slide start position 43 when the male tab 70 is not inserted, the sliding movement can be smoothly started.

[0042] Accordingly, to prevent the insertion stroke of a male tab from being extended and to facilitate gap man-

agement, a female terminal fitting 10 is provided with a substantially tubular main portion 30, into which a mating male tab 70 is or can be at least partly inserted along an axial center A from front, and a resilient contact piece 80 extending substantially backward in or at the main portion 30 and having a free or distal end slidable on an inner surface of the main portion 30. The inner surface of the main portion 30 includes a first slide surface 51 for displacing the free end of the resilient contact piece 80 with a distance thereof to the axial center A of the main portion 30 kept substantially constant while the free end of the resilient contact piece 80 slides from a slide start position 43 to a slide intermediate position 44 and a second slide surface 52 for displacing the free end of the resilient contact piece 80 in such a direction as to extend the distance to the axial center A of the main portion 30 while this free end slides from the slide intermediate position 44 to a slide end position 45.

<Other Embodiments>

[0043] The present invention is not limited to the above described and illustrated embodiment. For example, the following embodiments are also embraced by the technical scope of the present invention as defined by the claims.

(1) The first slide surface may be formed to have an inclination opposite to that of the second slide surface so that the free end of the resilient contact piece is displaced in a direction to shorten the distance between this free end and the axial center from the slide start position to the slide intermediate position. With such a first slide surface, the necessary contact pressure can be reached even earlier.

(2) The free end of the resilient contact piece and the inner surface of the main portion may not be in contact when the male tab is not inserted.

(3) The second slide surface may be a curved inclined surface.

(4) The inner surfaces of the elevated portion (slide surfaces) may include only the first and second slide surfaces without including the first and second elevating surfaces.

(5) The resilient contact piece may be provided at the base plate portion and the receiving portion may be provided at the facing plate portion.

(6) The free end of the resilient contact piece may have no spherical projection, and the curved surface of the bent portion or the like may come into sliding contact with the first and second slide surfaces.

LIST OF REFERENCE NUMERALS

[0044]

A axial center
10 female terminal fitting

30 main portion
41 elevated portion
43 slide start position
44 slide intermediate position
45 slide end position
51 first slide surface
52 second slide surface
80 resilient contact piece
84 spherical projection

Claims

1. A female terminal fitting, comprising:

a substantially tubular main portion (30), into which a mating male tab (70) can be at least partly inserted along an axial center (A) substantially from front, and

a resilient contact piece (80) formed to extend substantially backward in or at the main portion (30) and resiliently deformable by the male tab (70) being at least partly inserted into the main portion (30) such that the free end thereof slides on an inner surface of the main portion (30), wherein the inner surface of the main portion (30) includes:

a first slide surface (51) for displacing the free end of the resilient contact piece (80) in such a direction as to keep a distance between the free end and the axial center (A) of the main portion (30) substantially constant or to shorten the distance while the free end slides from a slide start position (43) to a slide intermediate position (44), and

a second slide surface (52) for displacing the free end of the resilient contact piece (80) in such a direction as to extend the distance between the free end and the axial center (A) of the main portion (30) while the free end slides from the slide intermediate position (44) to a slide end position (45).

2. A female terminal fitting according to claim 1, wherein the first and second slide surfaces (51, 52) are formed by partly embossing a peripheral wall of the main portion (80) to project inwardly.

3. A female terminal fitting according to one or more of the preceding claims, wherein the first slide surface (51) is horizontally continuous at the same height position in forward and backward directions (FBD) and the second slide surface (52) is obliquely continuous at the same angle of inclination with respect to forward and backward directions (FBD).

4. A female terminal fitting according to one or more of the preceding claims, wherein the first slide surface (51) and the second slide surface (52) relatively are arranged to define an obtuse angle therebetween. 5
5. A female terminal fitting according to one or more of the preceding claims, wherein the free end of the resilient contact piece (80) is in contact with the inner surface of a plate portion (32) of the main portion (80) when the resilient contact piece (80) is in a natural state where it is not in contact with the male tab (70). 10
6. A female terminal fitting according to one or more of the preceding claims, wherein the free end of the resilient contact piece (80) has an at least partly spherical projection (84) projecting toward the main portion (80), wherein the at least partly spherical projection (84) can be held in sliding point contact with the inner surface of the main portion (80). 15
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7. A female terminal fitting according to one or more of the preceding claims, wherein a part of the free end of the resilient contact piece (80) behind its contact portion with the main portion (80), preferably behind the spherical projection (84), serves as a bent portion (86) bent at an obtuse angle toward the axial center (A), so that the free end of the resilient contact piece (80) faces obliquely inwardly toward the back. 25
30
8. A female terminal fitting according to one or more of the preceding claims, wherein the male tab (70) can be resiliently sandwiched between a contact portion (82) of the resilient contact piece (80) and a receiving portion (36) provided at a substantially opposite portion (20) of the main portion (30). 35
9. A female terminal fitting according to one or more of the preceding claims, wherein the first and second slide surfaces (51, 52) are arranged on the inner surface of an elevated portion (41) formed by partly embossing a facing plate portion (32) of the main portion (30) to project inwardly, so that the necessary contact pressure with the male tab (70) can be adjusted to a desired value according to an embossing depth. 40
45

50

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FIG. 1

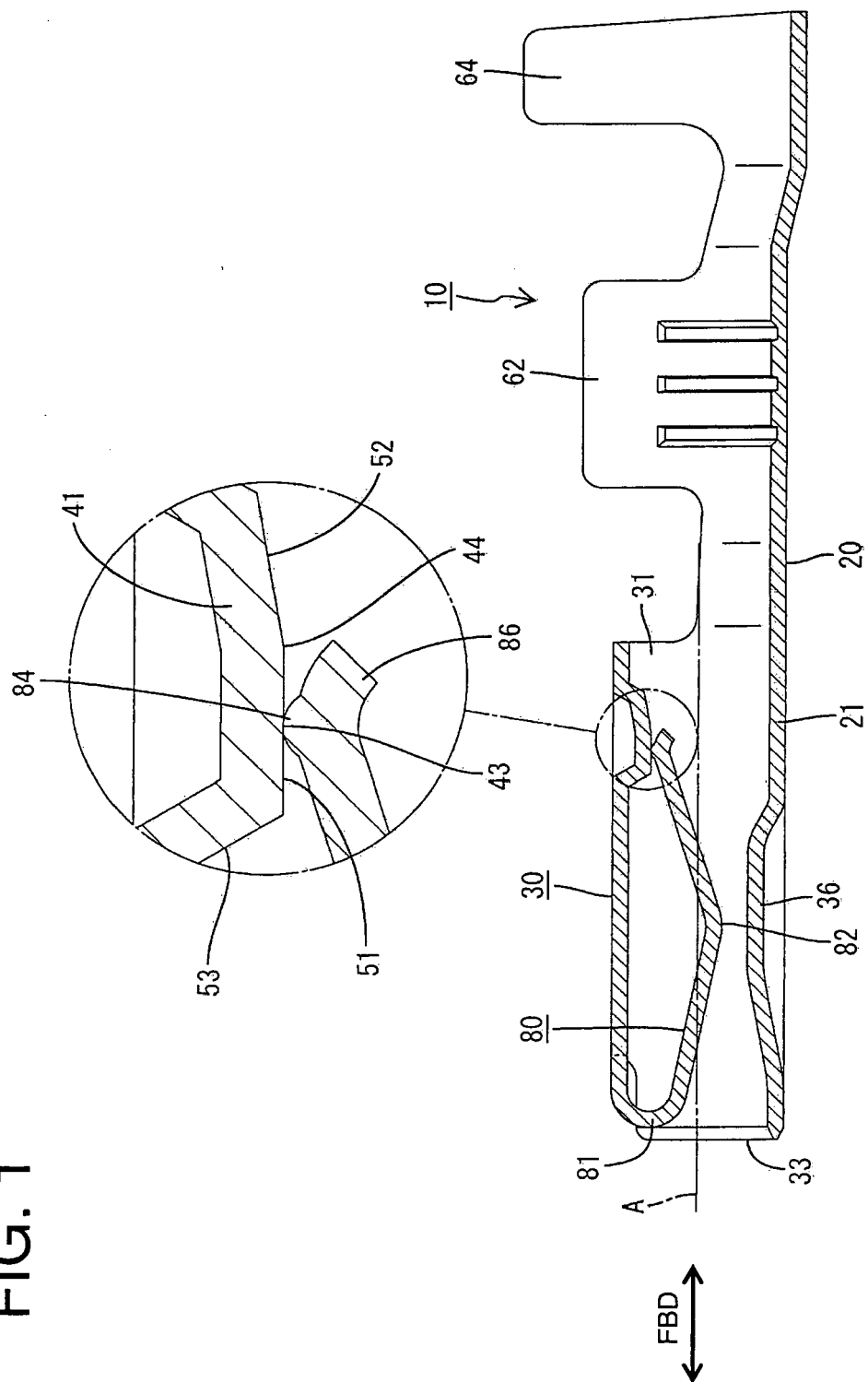


FIG. 2

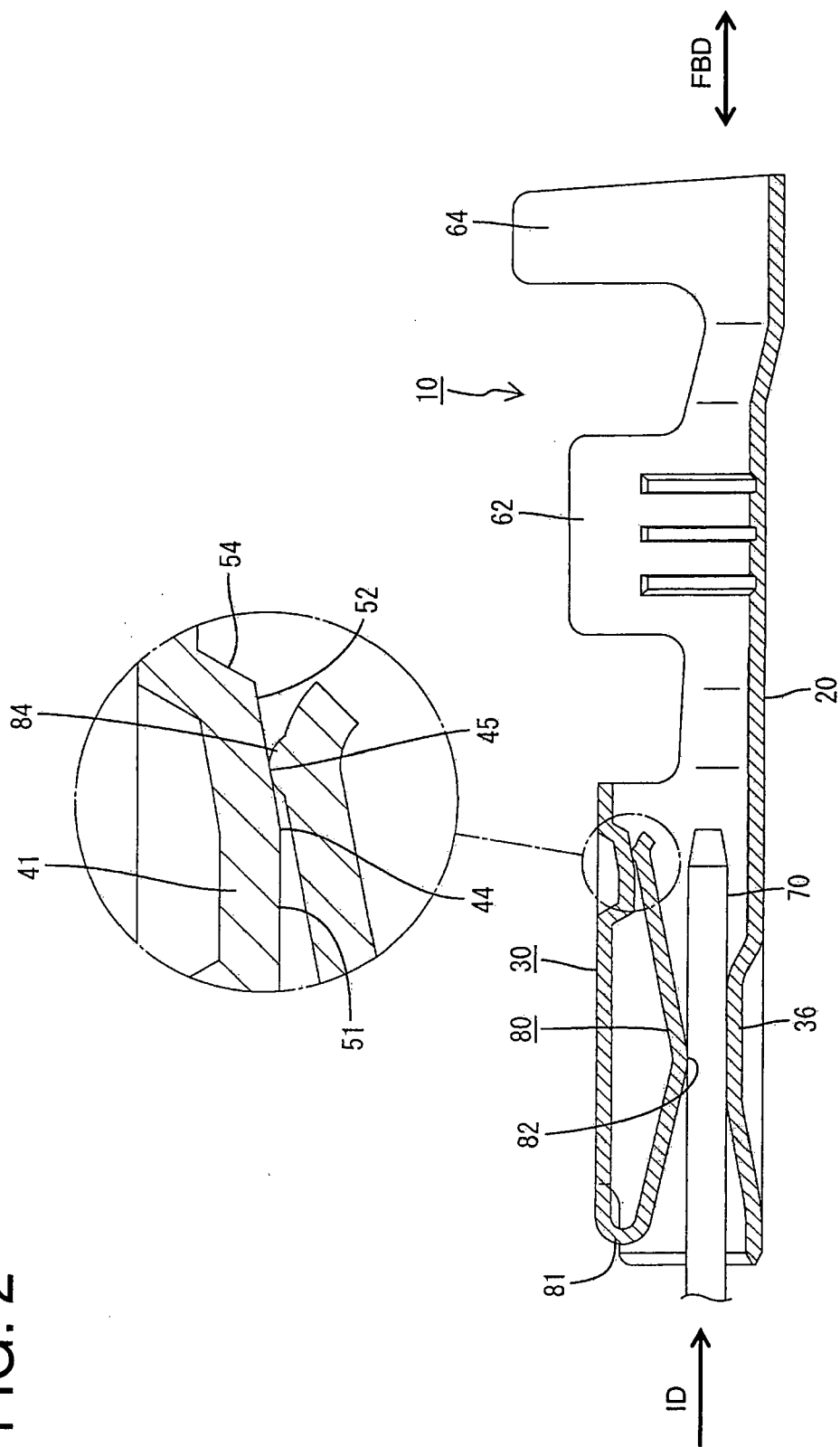


FIG. 3

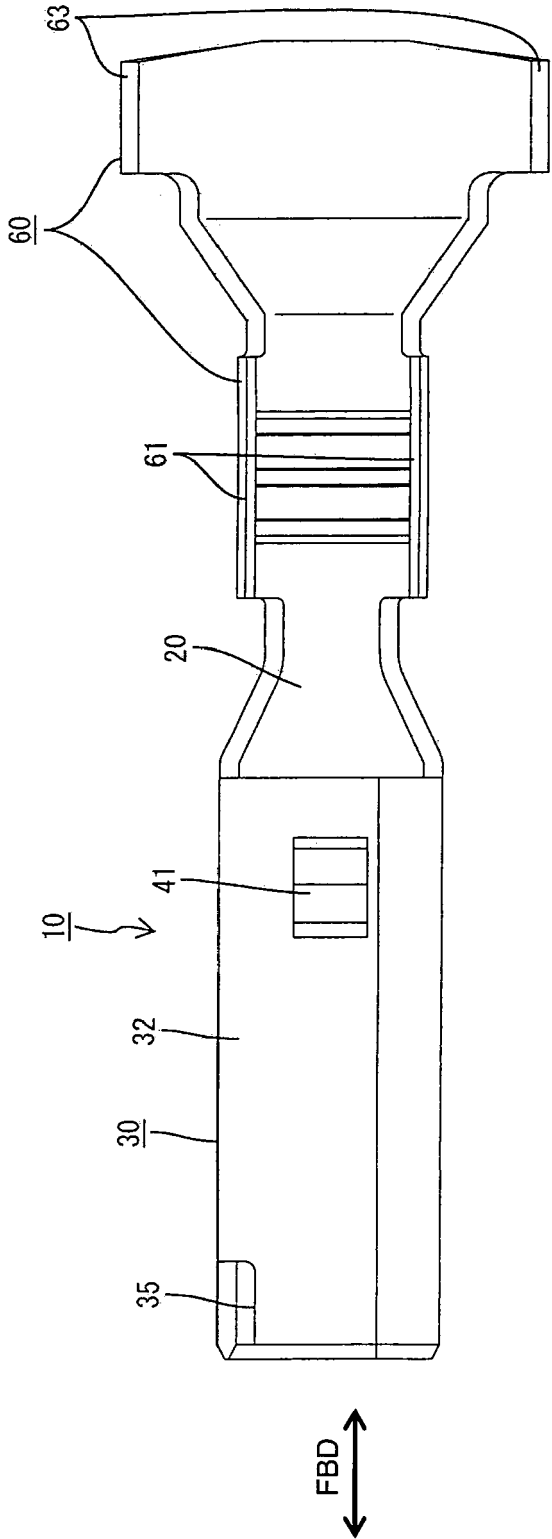
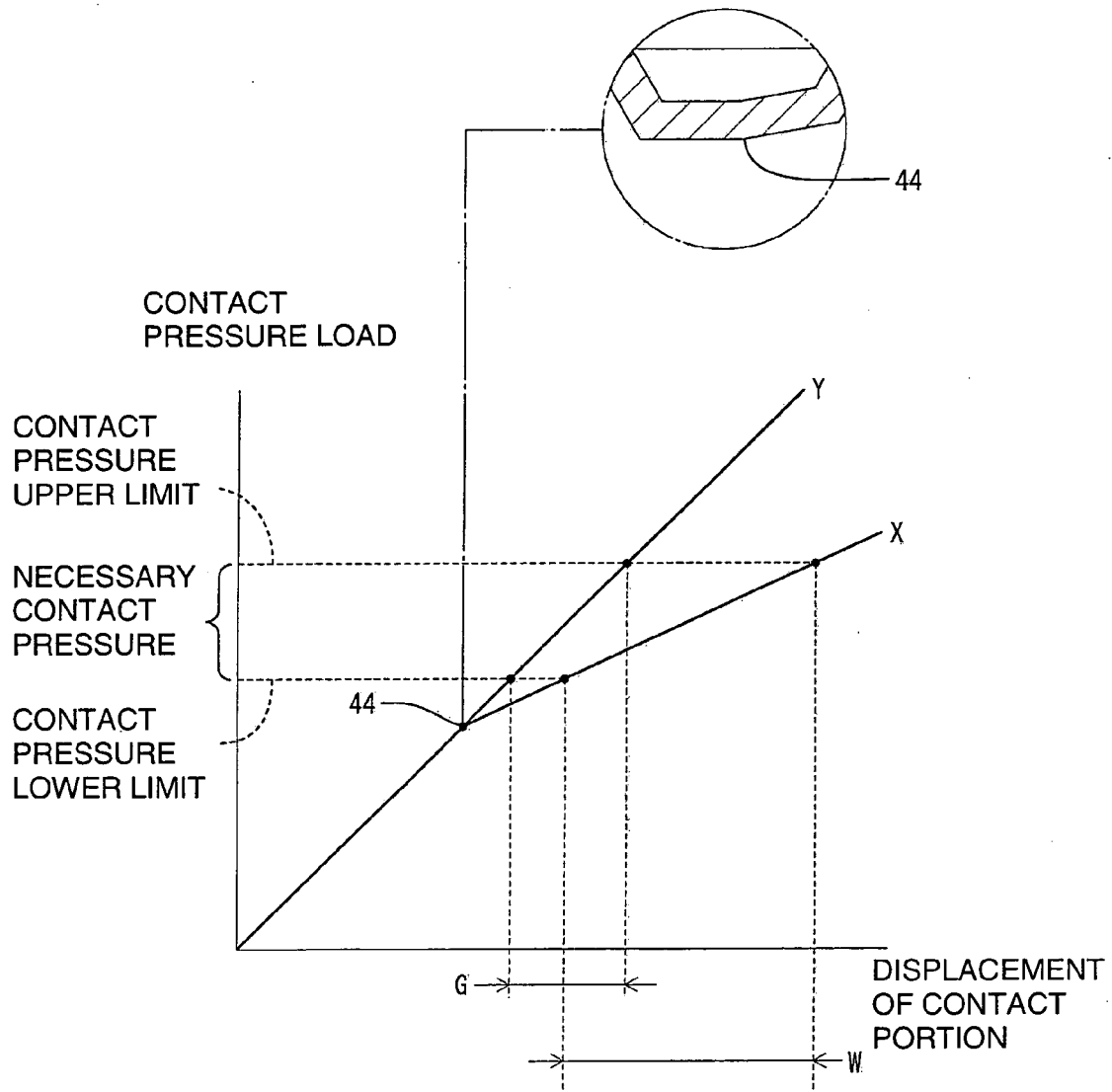


FIG. 4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 00 7865

DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 1 July 2008	Examiner Salojärvi, Kristiina
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 00 7865

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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